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PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Application of: Czaplicki, Michael J.; Le Gall Eric; and Eckmann, Bernd

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Group No.: 3726

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Examiner: Marc Quemuel Jimenez

For: HEAT ACTIVATED REINFORCING SLEEVE

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Declaration Under C.F.R. section 1.131

1. This declaration is to establish completion of the technology disclosed and claimed in this application, in the United States, on a date prior to January 31, 2000.
2. I am named as an inventor of the above application, and I am or was employed by L&L Products, Inc., the assignee of the above application.
3. Attached as Exhibit A are photocopies of design drawings of exemplary aspects of the technology of the present application.
4. Each of the drawings of Exhibit A was created prior to January 31, 2000.
5. Prior to January 31, 2000, a physical sample of each of the aspects illustrated in Exhibit A was placed within a cavity defined by a frame and/or pillar of an automotive vehicle and subjected to thermal activation for expanding the expandable material.
6. Upon hardening of the expanded material, the above samples provided structural reinforcement to the frame and/or pillar of the automotive vehicle, and therefore demonstrated that they functioned for their intended purpose, all prior to January 31, 2000.
7. In addition to the above, activities toward preparing this patent application to cover the above technology started prior to January 31, 2000 and were actively pursued from that point until the filing of the application serial no. 09/524,961 on March 14, 2000 (which application is a parent application to this continuation application).

8. The above referenced activities, occurring prior to January 31, 2000 all pertained to subject matter that corresponds with the text of the paragraphs in attached Exhibit B.
9. I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

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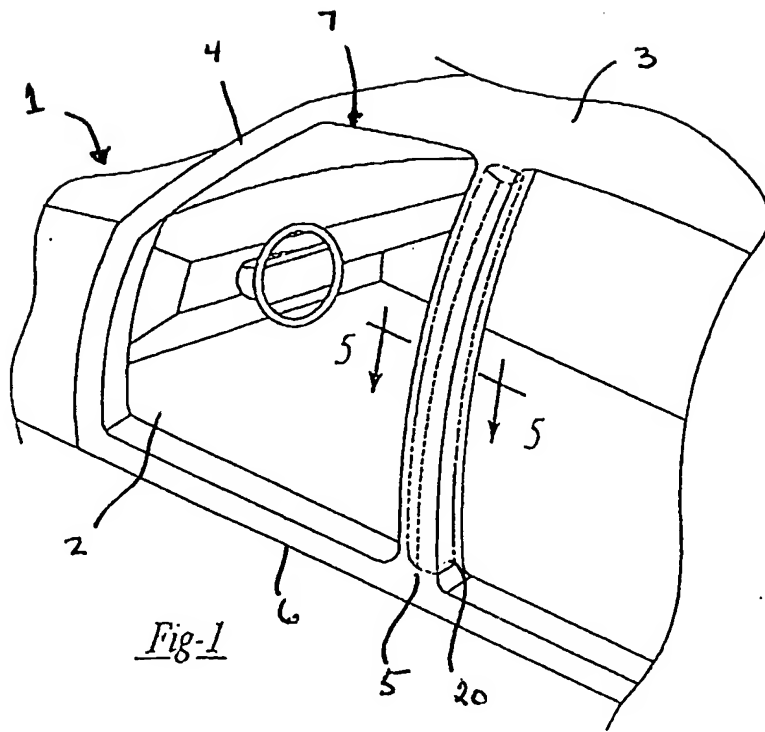


Fig-1

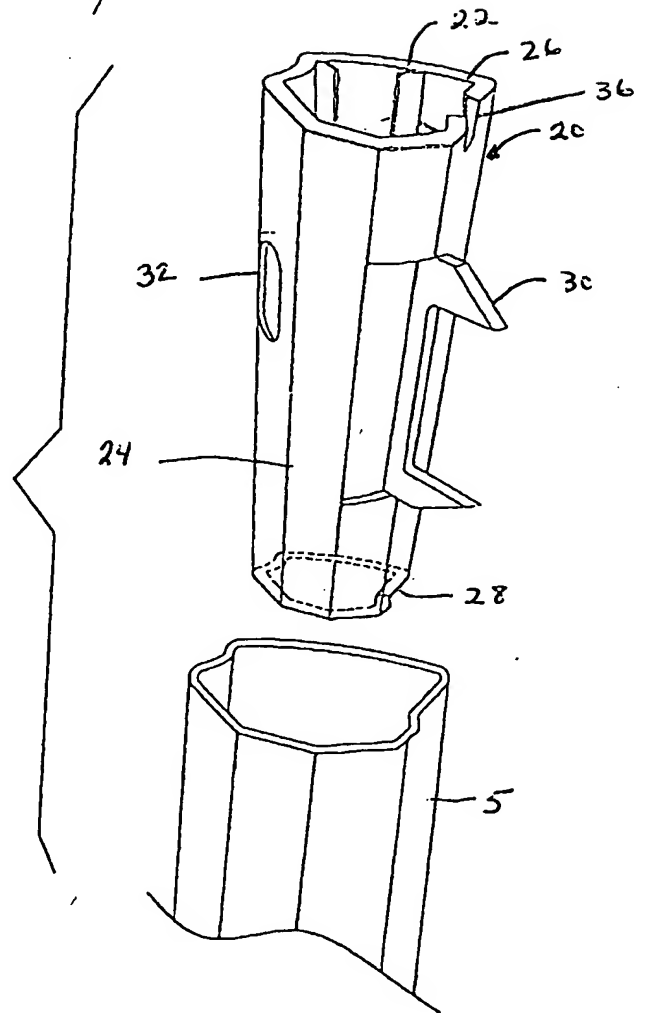


Fig-2

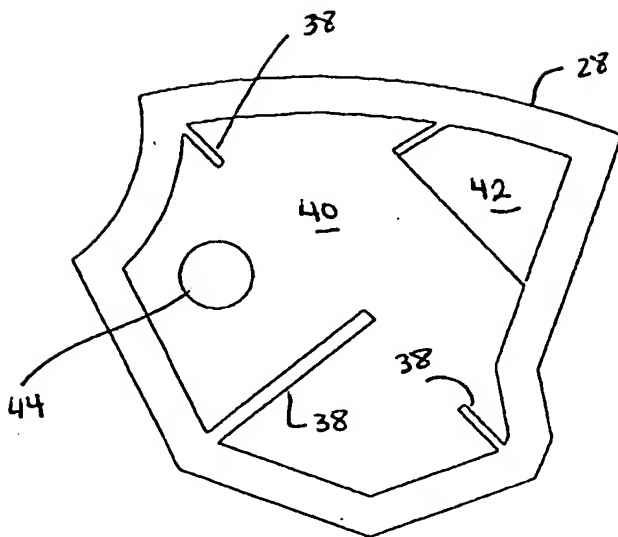


Fig-3

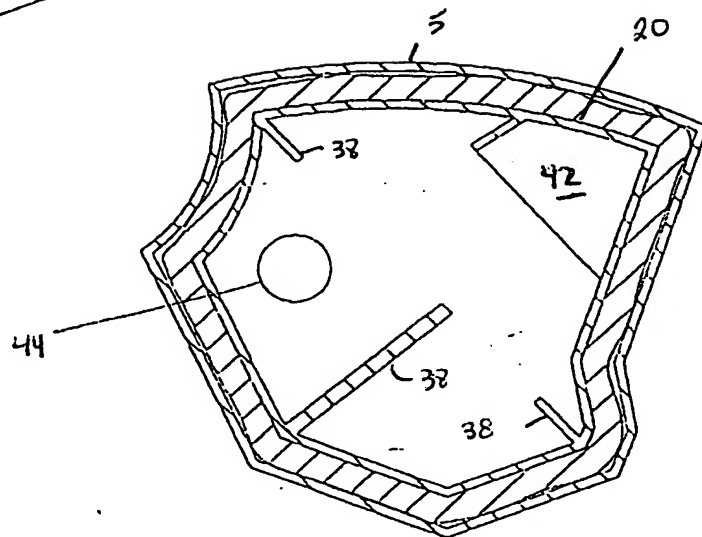


Fig-4

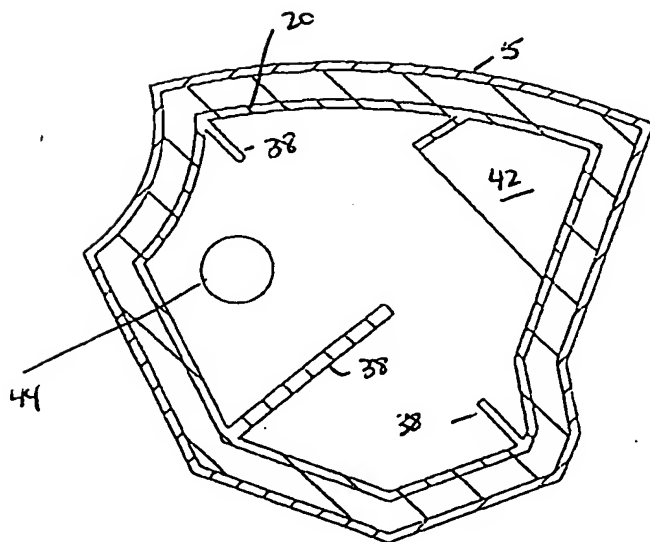


Fig-5



20. A method of reinforcing an automobile structure, comprising:
providing an elongated hollow automobile frame structure having a closed profile, the automobile frame structure defining a hollow center;
providing an elongated carrier having a longitudinal axis extending from a first open end to a second open end wherein the carrier includes:

- i) at least one opening extending therethrough;
- ii) a plurality of axially extending ribs; and
- iii) a contoured exterior surface having at least one sloping wall extending from adjacent the first open end to the second open end; and

applying a reinforcing medium to the carrier for forming a sleeve wherein the reinforcing medium is a heat activated expandable material that extends along at least a portion of the length of the carrier;

inserting the sleeve in the hollow center of the hollow frame structure such that there is a clearance between the sleeve and the automobile frame structure.

21. A method as in claim 20 wherein the carrier is asymmetrical about its longitudinal axis

22. A method as in claim 20 wherein the reinforcing medium is applied with a mini-applicator type extruder.

23. A method as in claim 20 wherein the carrier includes a notch that aligns with a portion of the frame structure upon insertion therein.

24. A method as in claim 20 further comprising forming the carrier of polymeric material by injection molding.

25. A method as in claim 24, wherein the polymeric material is one selected from the group consisting of sheet molding compound and mineral reinforced polymer.

26. A method as in claim 20, wherein the carrier has an offset portion that creates a clearance between the sleeve and a surface of the hollow beam upon insertion.

27. A method as in claim 25, wherein the reinforcing medium is an epoxy-based polymer having foamable characteristics.

28. A method as in claim 24 wherein cross-sections of the carrier taken perpendicular to the longitudinal axis narrow from the first end to the second end of the carrier.

29. A method as in claim 20 wherein the reinforcing medium has a relatively high glass transition temperature and substantially covers an entire outer surface of the elongated carrier.

30. A method as in claim 20 wherein a separate adhesive layer disposed upon the reinforcing medium.

31. A method of reinforcing an automobile structure, comprising:
providing an elongated hollow automobile frame structure having a closed profile, the automobile frame structure defining a hollow center;
providing an elongated carrier having a longitudinal axis extending from a first open end to a second open end wherein the carrier includes:

- i) at least one opening adapted for passage of components therethrough;
- ii) at least one outwardly extending bracket;
- iii) a plurality of axially extending ribs; and
- iv) a contoured exterior surface having a convex surface, a concave surface and at least one sloping wall extending from adjacent the first open end to the second open end; and

applying a reinforcing medium to the carrier for forming a sleeve wherein the reinforcing medium is a heat activated expandable material that extends along at least a portion of the length of the carrier;

locating an interior plate approximately at a center portion of the carrier for reinforcing the carrier; and

inserting the sleeve in the hollow center of the hollow frame structure such that there is a clearance between the sleeve and the automobile frame structure before expansion of the reinforcing medium.

32. A method as in claim 31 wherein the frame structure is a pillar structure of an automotive vehicle.

33. A method as in claim 32 wherein the pillar structure is selected from an A-pillar or a B-pillar

34. A method as in claim 31 further comprising locating an interior plate upon the carrier, the plate including an opening for permitting the passage of components through the carrier or for permitting ventilation.

35. A method as in claim 31 wherein the ribs extend inwardly relative to the carrier.

36. A method as in claim 31 wherein the cross-section of the carrier taken perpendicular to the axis narrows from the first end to the second end of the carrier.

37. A method of reinforcing an automobile structure, comprising:
providing an elongated hollow structure that forms at least a portion of an automotive vehicle frame, the hollow structure having one or more walls defining a hollow center;

providing an elongated carrier wherein:

- i) the carrier extends along a longitudinal axis between a first end and a second end;
- ii) an area of a cross-section taken perpendicular to the longitudinal axis adjacent the first end is substantially larger than an area of a cross-section taken perpendicular to the longitudinal axis at the second end;

- iii) the carrier defines a contoured exterior surface that is shaped to substantially correspond to the one or more walls of the hollow structure; and
- iv) the contoured exterior surface includes at least one sloping wall; applying a reinforcing medium to the carrier, wherein:
 - i) the reinforcing medium extends along at least a portion of the carrier in the direction of the longitudinal axis; and
 - ii) the reinforcing medium is a sealing material that is applied to multiple surfaces of the carrier; andinserting the carrier in the hollow center of the hollow frame structure.

38. A method as in claim 37 wherein the carrier includes a bracket extending from the exterior surface for assisting in locating the carrier within the elongated hollow structure.

39. A method as in claim 37 wherein the hollow structure is a pillar structure of an automotive vehicle.

40. A method as in claim 37 wherein cross-sections of the carrier taken perpendicular to the longitudinal axis narrow from the first end to the second end of the carrier.